

CLAIMS

What is claimed is:

1. A negative electrode for a lithium battery, comprising:
a metallic lithium plate; and
a negative electrode tab attached to a surface of the metallic lithium plate,
wherein an average surface roughness of the metallic lithium plate on an area attached to the negative tab is 0.1 to 5 μm .
2. The negative electrode for a lithium battery according to claim 1, wherein the average surface roughness is 0.3 to 0.6 μm .
3. The negative electrode for a lithium battery according to claim 1, wherein the metallic lithium plate is a metallic lithium foil.
4. The negative electrode for a lithium battery according to claim 1, wherein the metallic lithium plate is a metallic lithium coated on a conductive substrate.
5. The negative electrode for a lithium battery according to claim 4, wherein the conductive substrate is selected from the group consisting of a metal foil, a metal film, a conductive polymer film, and a polymer film deposited with a metal.
6. The negative electrode for a lithium battery according to claim 1, wherein the negative electrode tab is a 10 to 50 μm thick metal plate.
7. The negative electrode for a lithium battery according to claim 1, wherein the negative electrode tab is a 10 to 50 μm thick metal foam.
8. The negative electrode for a lithium battery according to claim 1, wherein the negative electrode tab is made of at least one metal selected from the group consisting of nickel, copper, iron, and stainless steel.

9. A negative electrode for a lithium battery, comprising:
a metallic lithium plate; and
a negative electrode tab attached to the metallic lithium plate,
wherein the negative electrode tab has a porosity of 50 to 100%.
10. The negative electrode for a lithium battery according to claim 9, wherein the metallic lithium plate is a metallic lithium foil.
11. The negative electrode for a lithium battery according to claim 9, wherein the metallic lithium plate is a metallic lithium coated on a conductive substrate.
12. The negative electrode for a lithium battery according to claim 11, wherein the conductive substrate is selected from the group consisting of a metal foil, a metal film, a conductive polymer film, and a polymer film deposited with a metal.
13. The negative electrode for a lithium battery according to claim 9, wherein the negative electrode tab is composed of at least one metal selected from the group consisting of nickel, copper, iron, and stainless steel.
14. The negative electrode for a lithium battery according to claim 9, wherein the porosity of the negative electrode tab is 80 to 95%.
15. A negative electrode for a lithium battery, comprising:
a metallic lithium plate; and
a negative electrode tab attached to an upper and a lower end surfaces of the metallic lithium plate.
16. The negative electrode for a lithium battery according to claim 15, wherein the metallic lithium plate is a metallic lithium foil.
17. The negative electrode for a lithium battery according to claim 15, wherein the metallic lithium plate is a metallic lithium coated on a conductive substrate.

18. The negative electrode for a lithium battery according to claim 17, wherein the conductive substrate is selected from the group consisting of a metal foil, a metal film, a conductive polymer film, and a polymer film deposited with a metal.

19. The negative electrode for a lithium battery according to claim 15, wherein the negative electrode tab is made of at least one metal selected from the group consisting of nickel, copper, iron, and stainless steel.

20. A negative electrode for a lithium battery comprising:
a metallic lithium plate; and
a negative electrode tab attached to a surface of metallic lithium plate,
wherein a surface of the negative electrode tab that is attached to the metallic lithium plate has a surface area of 10% larger than a geographical area.

21. The negative electrode for a lithium battery according to claim 20, wherein the metallic lithium plate is a metallic lithium foil.

22. The negative electrode for a lithium battery according to claim 20, wherein the metallic lithium plate is a metallic lithium coated on a conductive substrate.

23. The negative electrode for a lithium battery according to claim 22, wherein the conductive substrate is selected from the group consisting of a metal foil, a metal film, a conductive polymer film, and a polymer film deposited with a metal.

24. The negative electrode for a lithium battery according to claim 20, wherein the negative electrode tab is made of at least one metal selected from the group consisting of nickel, copper, iron, and stainless steel.

25. A negative electrode for a lithium battery according to claim 20, wherein a surface area contacting the metallic lithium plate of the negative electrode tab is increased by 50 to 100% compared to the geographical area.

26. A method of fabricating a negative electrode for a lithium battery, comprising:

brushing the surface area of a metallic lithium plate to be attached to a negative electrode tab so that an average surface roughness of a surface area (R_a) is 0.1 to 5 μm ; and pressing the negative electrode tab onto the metallic lithium plate and attaching the negative electrode tab to the metallic lithium plate.

27. A lithium battery comprising;

a negative electrode;

a positive electrode; and

an electrolyte,

wherein the negative electrode further comprises a metallic lithium plate and a negative electrode tab attached to a surface of the metallic lithium plate, wherein an average surface roughness of the metallic lithium plate on an area attached to the negative tab is 0.1 to 5 μm .

28. A lithium-sulfur battery comprising:

a negative electrode comprising a metallic lithium plate and a negative tab attached to a surface of the metallic lithium plate, wherein the average surface roughness of the metallic lithium plate on an area attached to the negative tab is 0.1 to 5 μm , and

a positive electrode comprising a positive active material selected from the group consisting of elemental sulfur, Li_2S_n ($n \geq 1$), Li_2S_n ($n \geq 1$) dissolved in a catholyte, an organosulfur compound, and a carbon-sulfur polymer $((\text{C}_2\text{S}_x)_n$: $x = 2.5$ to 50, $n \geq 2$), and an electrolyte.